

AMENDMENTS TO THE CLAIMS

Please replace all prior versions of the claims with the following claim listing:

Claims:

1-78. (Canceled)

79. (New) A method comprising:

providing a substrate having a material selected from the group consisting of polymeric materials, ceramic materials, glass materials, metal materials, composites thereof, and laminates thereof, wherein the substrate comprises a first surface having an initial surface area; and

performing a surface-altering process utilizing a partially transmissive mask that allows a fraction of light to pass therethrough, the surface-altering process altering the first surface of the substrate resulting in a surface area of the first surface that is greater than the initial surface area.

80. (New) The method of claim 79, wherein the partially transmissive mask is a dot grayscale mask.

81. (New) The method of claim 79, wherein the partially transmissive mask is a line-and-space grayscale mask.

82. (New) The method of claim 79, wherein the surface-altering process is a subtractive process in which portions of the first surface are removed.

83. (New) The method of claim 82, wherein the subtractive process comprises:

applying a light pattern to the first surface, the light pattern having a plurality of light/dark interfaces for creating power gradients.

84. (New) The method of claim 83, wherein the light is applied through the partially transmissive mask.

85. (New) The method of claim 82, wherein the subtractive process involves a lithographic process.

86. (New) The method of claim 85, wherein the lithographic process involves dry etching.

87. (New) The method of claim 85, wherein the lithographic process involves wet etching using a liquid or plasma.

88. (New) The method of claim 85, wherein the substrate comprises a photosensitive material, and the lithographic process further comprises:

- locating a photo-reflective mask over the photosensitive material;
- exposing to laser light the portions of the photosensitive material that are not reflected by the mask; and
- removing the exposed material.

89. (New) The method of claim 85, wherein the lithographic process comprises:

- forming on the first surface a pattern having predefined size, shape, and placement.

90. (New) The method of claim 85, wherein the lithographic process comprises:

- forming on the first surface a pattern having random size, shape, and placement.

91. (New) The method of claim 82, wherein the subtractive process comprises:

- applying a reactive chemical material to the first surface of the substrate; and
- irradiating the reactive chemical material with laser light, wherein the laser light causes a chemical reaction that alters the first surface.

92. (New) The method of claim 82, wherein the subtractive process involves a laser ablation process.

93. (New) The method of claim 92, wherein the laser ablation process comprises:

scanning a laser beam across the first surface of the substrate.

94. (New) The method of claim 93, wherein the laser ablation process further comprises:

scanning the laser beam through a plurality of laser ablation masks defining a pattern of laser light incident on the first surface.

95. (New) The method of claim 92, wherein the laser ablation process comprises:

applying multiple pulses of laser light.

96. (New) The method of claim 82, wherein the subtractive process involves chemical roughening.

97. (New) The method of claim 79, wherein the surface-altering process is an additive process in which material is added to the first surface of the substrate.

98. (New) The method of claim 97, wherein the additive process involves an adsorptive process.

99. (New) The method of claim 97, wherein the additive process comprises:

bonding a high surface-area layer to the first surface of the substrate.

100. (New) The method of claim 97, wherein the additive process further comprises:

patterning the high surface-area layer by a lithographic process.

101. (New) The method of claim 79, wherein the surface-altering process comprises:

resolving the first surface of the substrate to resemble the features of the mask.

102. (New) The method of claim 79, wherein the surface-altering process comprises:

altering the first surface of the substrate such that the resulting patterns on the altered surface are non-linearly related to the patterns on the partially transmissive mask.

103. (New) The method of claim 79, wherein the resulting surface area of the first surface is at least 1,000 times greater than the initial surface area.

104. (New) A substrate comprising:

a material selected from the group consisting of polymeric materials, ceramic materials, glass materials, metal materials, and composites thereof; and

a surface having features formed by the treatment of a surface-altering process that utilizes a partially transmissive mask that allows a fraction of light to pass therethrough, the surface area of the treated surface being greater than the surface area of an untreated surface.

105. (New) The substrate of claim 104, wherein the surface area of the treated surface is at least 1,000 times greater than the surface area of an untreated surface.

106. (New) The substrate of claim 104, wherein the material comprises a polyimide.

107. (New) An analysis device comprising the substrate of claim 104.

108. (New) An apparatus for forming a high surface-area substrate, the apparatus comprising:

a laser configured to irradiate a beam of light for ablating a surface of a substrate;

a partially transmissive mask for reflecting at least a portion of the light, whereby the transmissive light alters the surface of the substrate to produce a surface area of the surface that is greater than the surface area of an untreated surface.

109. (New) The apparatus of claim 108, wherein the partially transmissive mask comprises a pattern of opaque dots on a fully transmissive surface.

110. (New) The apparatus of claim 108, wherein the partially transmissive mask comprises a pattern of at least partially transmissive dots on an opaque surface.

111. (New) The apparatus of claim 110, wherein the at least partially transmissive dots are fully transmissive.

112. (New) The apparatus of claim 108, wherein the partially transmissive mask comprises a pattern of opaque lines on a fully transmissive surface.

113. (New) The apparatus of claim 108, wherein the partially transmissive mask comprises a pattern of at least partially transmissive lines on an opaque surface.

114. (New) The apparatus of claim 113, wherein the at least partially transmissive lines are fully transmissive.